Distributional Welfare Impact of the 2013 Adjustment of Tax-Free Income Threshold in Indonesia: A CGE Simulation

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ABSTRACT

A tax-free threshold, the level of income that the tax rate is zero, in Indonesian tax system is initially motivated by equity principle. The government of Indonesia periodically adjusts the tax-free threshold to keep the purchasing power of the low-income household's group. Within the last decade, there were three times adjustment in 2006, 2009, and the last started effectively implemented in January 2013. The magnitude of the last adjustment is relatively high, the tax-free threshold increased by 53.4%. The policy objective is not only to protect the poor from paying tax but also to stimulate the economic growth through consumption. This study analyses the impact of the 2013 tax-free threshold adjustment with the main focus on the distributional welfare impact using an integrated multi-households computable general equilibrium (CGE) model. The model's database consolidated from three key data sources: (a) the 2008 Indonesian Input-Output Table; (b) the 2008 Indonesian Social Accounting Matrix; and (c) the 2008 National Socioeconomic Survey.

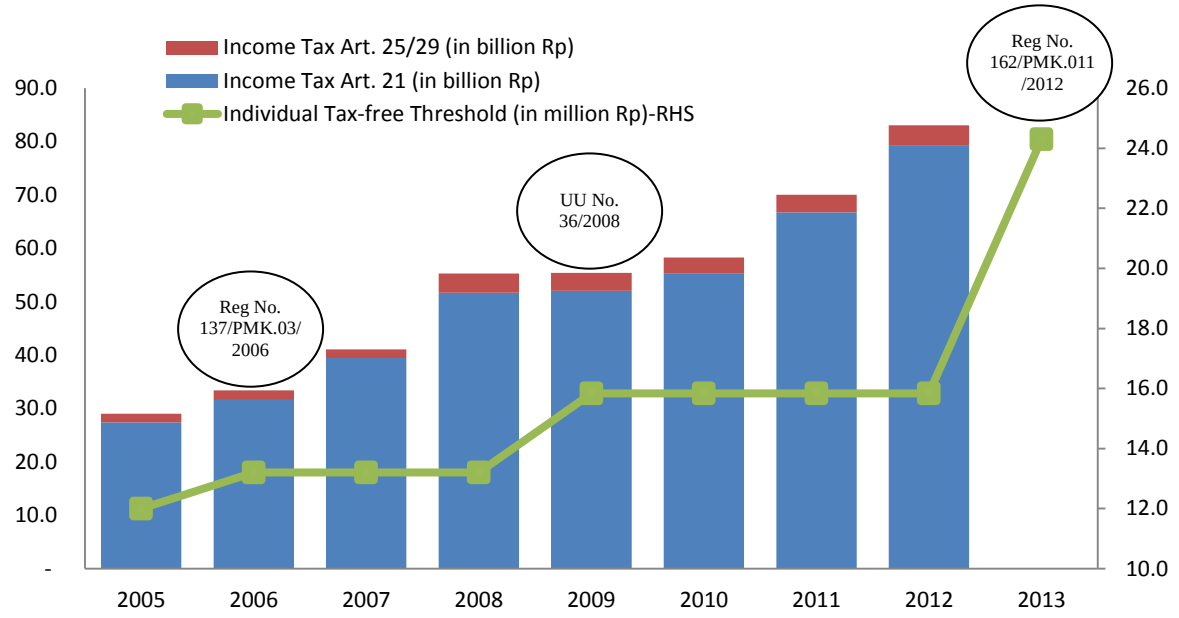
Keywords: CGE model, tax-free threshold, welfare

1. INTRODUCTION

A tax-free income threshold (*Penghasilan Tidak Kena Pajak/PTKP*; Bahasa Indonesia) is the level of household income that the tax rate is zero. The government of Indonesia periodically adjusts the tax-free threshold to keep the purchasing power of the low-income household's group. Within the last decade, there were three times adjustment in 2006, 2009, and the last in 2013 as regulated by the Regulation of Ministry of Finance No. 162/PMK.011/2012. Figure 1 shows the level of tax-free income threshold and the government revenue from personal income tax which divided into income tax article 21 and income tax article 25/29. From the figure, it is shown that in the previous policies of raising the tax-free income threshold slow down the growth of personal income revenue in the year of implementation and in the following year. Afterward the revenue of personal income tax is back to grow significantly.

[1] Paper presented at *the 21st International Input-Output Conference, July 9 - 12, 2013, Kitakyushu, Japan*.

FIGURE 1: Personal Income Tax[2] Revenue and the Individual Tax-free Threshold



Source: Ministry of Finance; temporary number for 2012 income tax revenue

The magnitude of the last adjustment is relatively high, the tax-free threshold increased by 53.4% (see Table 1). The policy objective is not only to protect the poor from paying tax but also to stimulate the economic growth through consumption. The economic crises in Euro zone and USA pressure the international trade activities and affect the Indonesia economy. Responding this situation, Indonesia focuses to the domestic market in order to keep the level of economic growth. The 2013 raising tax-free income threshold policy put in this context.

TABLE 1: The adjustment of the 2013 tax-free income threshold

	Law No. 36/2008 (Rp)	Reg. No.62/PMK.011/2012 (Rp)	(% Change)
Individual taxpayer	15,840,000	24,300,000	53.4
Spouse	1,320,000	2,025,000	
Each dependent (max. 3)	1,320,000	2,025,000	

A tax-free income threshold was initially motivated largely by equity considerations. Saunders (2006, p. xxvi) argues that, '… the tax-free threshold should be raised to a level above the welfare minimum (subsistence) level ... it would mean that all taxpayers enjoyed a substantial tax cut'. Some countries apply tax-free income threshold while other used another scheme such as transfer or tax rebate to the targeted taxpayers. Creedy et al (2008) criticise that, 'Raising the threshold in order to help low-income groups actually has a low 'target efficiency' in that it

[2] In the Indonesian tax system, Income Taxes (*Pajak Penghasilan/PPh*) consist of taxes on different kinds of income stipulated in the different articles of the Income Tax Law. Personal Income Tax is governed by Income Tax Article 21 (salary and wages tax) and Income Tax Article 25/29.

involves at least the same absolute gains by those subject to higher marginal tax rates.' Their study suggests eliminating the tax-free threshold in Australia and offering several options such as low income tax offset (tax rebate) in order to have better redistribution of income. For the reason of administrative constraint, Indonesia keeps the tax-free income threshold in its personal income tax system.

In the empirical works, there are some studies that evaluate the distributional impact of the government policy such as Abdurohman and Resosudarmo (2012), and Atuesta and Hewings (2012). Abdurohman and Resosudarmo (2012) simulate the 2009 fiscal stimulus package to evaluate the impact to the Indonesia economy using IRSA-5 CGE model. They found that the stimulus in the form of tax cut is more efficient than in the form of government spending. The impact is not only foster the economic growth but also reduce the poverty level. Atuesta and Hewings (2012) evaluate the distributional welfare impact of the legalization of drugs using CGE micro-simulation model for Colombia. They suggest that the economic welfare of rural and urban households is slightly increase but only when the government reinvests the money to the productive sectors.

This paper examines the distributional welfare impact of the adjustment of tax-free income threshold that started to be implemented by 1 January 2013. Four policies are analysed, not only the adjustment of tax-free income threshold but also three competing alternatives such as eliminating the tax-free income threshold and replaced by low income tax offset, reducing the higher marginal tax rates, and giving cash transfer to poor households. The impacts of the policy are evaluated in term of fiscal, macro, and distributional welfare between household categories. The paper is divided as follows. Section 2 presents a description of the data used in the development of the CGE model and the summary of the model's features. Section 3 presents simulation scenarios and the magnitude of shocks including the description of how the magnitudes of shocks are estimated. Then Section 4 discusses the simulation results for each scenario. Finally, Section 5 provides some concluding remarks and policy implications.

2. DESCRIPTION OF THE CGE MODEL: DATA USED AND FEATURES

2.1. Description of the Data

The database of the CGE model is consolidated from three key data sources: (a) the 2008 Indonesian IO Table; (b) the 2008 Indonesian Social Accounting Matrix; and (c) the 2008 National Socioeconomic Survey. All the data were published by BPS-Statistics Indonesia. There are two main steps to consolidate the three data sources into the final model database. First step is expanding household category in the 2008 SAM and the 2008 IO table using the information from Susenas 2008. Second step is combining and compiling the extended 2008 IO Table with the extended 2008 SAM to have all the features of the model database (Amir, 2011).

The 2008 Indonesian SAM is a single output type industry, one industry produce one

commodity. The production sectors are classified as follows: food crops, other crops, livestock, forestry, fishery, coal-ore-oil mining, other mining, food-beverage-tobacco, textiles, woods, papers-equipments, chemicals, electricity-gas-water, constructions, trade, restaurant-hotel, road transportation, air-water transportation, transportation support, banking-finance, real estate, government services, and other services. Furthermore, there are four margins (trade and various transportation costs), two sources (domestic and import), two primary factors (16 types of labour and one capital), and 200 household classifications to represent percentile income distribution in rural and urban areas. Even though, the model has 200 household categories, the presentation in this paper are aggregated into 10 (deciles) household categories due to the space limit.

Table 2 and 3 present the factor demand and the factor supply, respectively, disaggregated for household categories. Food crops, other crops, livestock, other mining, trade, restaurant-hotel, road transportation, transportation supports, government services, and other services are considered labour-intensive sectors. Table 2 also shows the proportion of labour types for each sector and classified into two areas: rural and urban. For example, we can see easily that the restaurant-hotel sector is labour intensive with the concentration of clerical labour type; and most of them are located in the urban area. On the other hand, the food crops is a labour intensive sector with 83.73% of its production factors is the agricultural labour in rural area. Bank-finance is the best example for capital-intensive sector and its activities are concentrated in urban area.

TABLE 2: Proportion of factors of production used for each economic activity (%)

	Agricultural		**Manual**		**Clerical**		**Professional**		**Capital**
	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	
Food crops	83.73	9.72	0.28	0.06	0.22	0.06	0.26	0.09	5.58
Other crops	70.90	7.17	1.46	0.70	1.15	0.53	0.48	0.16	17.45
Livestock	54.65	9.29	1.49	1.24	1.34	1.08	0.61	0.81	29.49
Forestry	22.91	6.57	3.38	0.70	1.43	1.82	0.66	0.63	61.88
Fishery	23.57	11.03	0.36	0.60	0.39	0.63	0.18	0.12	63.11
Coal-ore oil mining	-	-	2.23	3.79	0.62	3.45	0.22	2.05	87.64
Other mining	-	-	38.52	25.85	2.17	2.62	3.91	0.97	25.96
Food-beverage-tobacco	-	-	14.08	19.96	1.55	4.31	0.30	1.74	58.06
Textiles	-	-	10.46	25.18	0.58	4.56	0.16	1.22	57.84
Woods	-	-	24.89	20.96	0.49	1.78	0.53	1.09	50.27
Papers-equipment	-	-	9.16	21.84	0.73	6.58	0.39	2.88	58.42
Chemicals	-	-	8.98	12.99	0.82	4.77	0.47	2.75	69.23
Electricity-gas-water	-	-	1.94	3.09	0.89	3.84	0.48	2.58	87.17
Constructions	-	-	20.13	19.62	0.39	3.17	0.58	3.09	53.02
Trade	-	-	1.56	5.44	27.66	51.04	0.43	2.20	11.69
Restaurant-hotel	-	-	0.93	2.68	20.38	55.00	0.25	2.09	18.68
Road transportation	-	-	24.42	42.63	4.00	9.41	0.26	1.66	17.62
Air-water transportation	-	-	6.41	8.71	3.41	14.93	0.25	3.13	63.17
Transportation supports	-	-	10.94	22.21	8.23	30.02	0.55	5.21	22.84
Bank-finance	-	-	0.24	0.93	4.10	19.16	0.53	5.43	69.62
Real estate	-	-	0.70	2.63	1.23	11.97	0.33	6.13	77.01
Government services	-	-	1.36	5.51	6.07	22.37	18.59	32.66	13.44
Other services	-	-	5.74	14.21	5.83	27.37	1.12	6.39	39.35

Source: Indonesian SAM 2008

Table 3 present the standard SAM categories of the factor income and its modification to represent distributional of household income. The most of capital are belongs to corporations, it accounts for 66.86%. The rest is divided into 20 household categories with the concentration of ownership about 12.5% in the highest deciles in rural and urban areas. The urban households receive 55.47% of total labour income while the rural households only 44.53%.

TABLE 3: Proportion of each of the factors of production received by institution

Standard SAM				Modified SAM			
	Rural labour	Urban labour	Capital		Rural labour	Urban labour	Capital
Agr workers	1.86	2.06	0.48	R_D1	1.67	-	0.25
Agr employers	14.48	4.80	5.56	R_D2	2.28	-	0.47
Rural: low	12.41	-	3.84	R_D3	2.66	-	0.63
Rural: others	4.15	-	1.55	R_D4	3.04	-	0.79
Rural: high	11.63	-	5.95	R_D5	3.44	-	0.96
Urban: low	-	19.25	5.49	R_D6	3.90	-	1.18
Urban: others	-	6.35	2.22	R_D7	4.47	-	1.41
Urban: high	-	23.01	8.06	R_D8	5.25	-	1.75
				R_D9	6.50	-	2.34
				R_D10	11.32	-	5.96
				U_D1	-	1.82	0.19
				U_D2	-	2.53	0.39
				U_D3	-	3.05	0.56
				U_D4	-	3.56	0.77
				U_D5	-	4.08	1.02
				U_D6	-	4.68	1.33
				U_D7	-	5.45	1.65
				U_D8	-	6.54	2.03
				U_D9	-	8.36	2.78
				U_D10	-	15.41	6.67
Corporations	-	-	66.86	Corporations	-	-	66.86
Total	44.53	55.47	100.00		44.53	55.47	100.00

2.2. Description of the CGE model features

The CGE model used for the policy simulations is modified from Indofiscal (Amir, 2011; Amir et al., 2013) and updated with the most current data. Aspects of the model were based on ORANI-G (Horridge, 2003) and the Applied General Equilibrium Model for Fiscal Policy Analysis (AGEFIS) developed by Yusuf et al. (2008). This model adopted AGEFIS to incorporate useful information from the 2008 Indonesian SAM, especially the part regarding transactions between agents in the economy. AGEFIS is the first fully SAM-based CGE model of the Indonesian economy with a focus on fiscal policy analysis. SAM-based CGE models provide better information, particularly if the focus is on the analysis of fiscal policy, which requires more detailed information about the flow of transactions from government revenue and expenditures, as well as households. The theoretical structure of the model is based on the Johansen approach, in which the equations are linearised using percentage changes instead of the levels of variables. This is also the approach

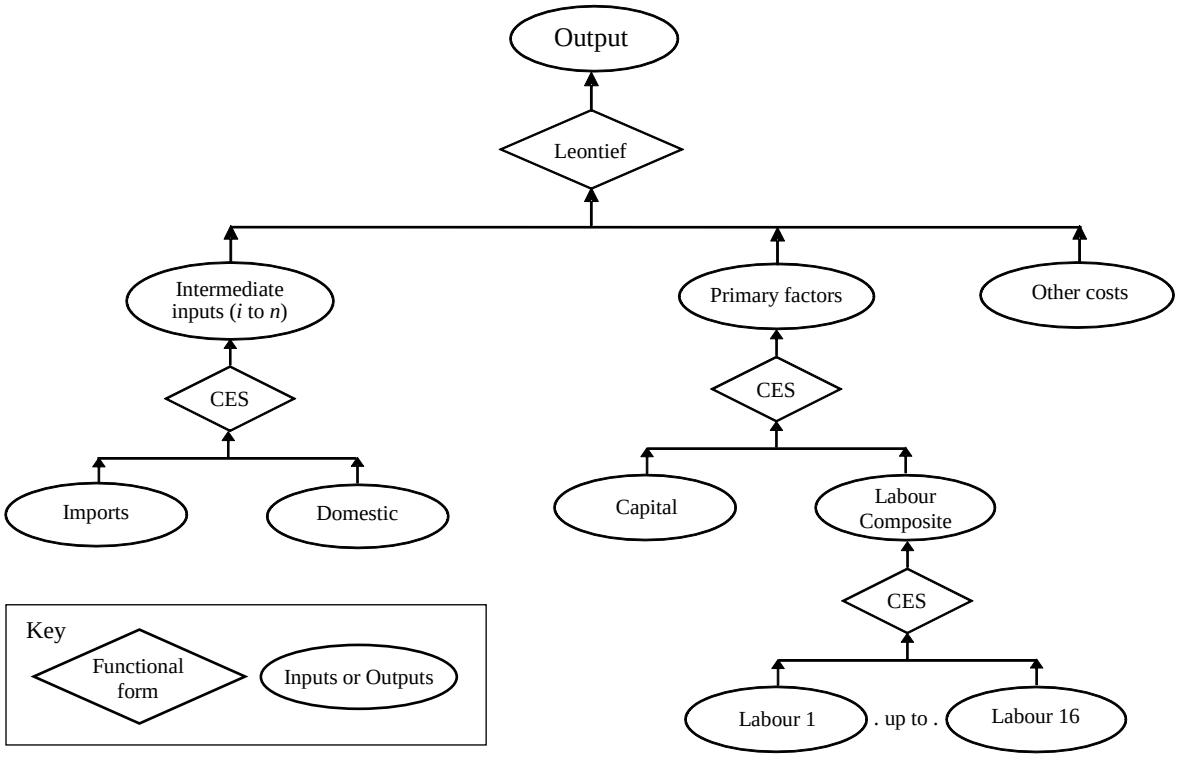
used by most Australian CGE models such as ORANI (P.B. Dixon et al., 1982) and MONASH (Peter B. Dixon and Rimmer, 2002). In terms of extending the household categories to have adequate features on poverty and income distribution analysis, this study adopted the approach from Yusuf (2007).

Structure of production

The nested structure of production illustrated in Figure 2 follows the approach in models such as ORANI-G (Horridge, 2003), or WAYANG (Wittwer, 1999). The industries in the model are single output industries, using as inputs domestic and imported commodities, primary factors and other costs. The primary factors of production include capital and 16 labour types as mentioned earlier.

Output is produced through a two-level process. In the top level, the production of output in each industry requires intermediate inputs, primary factors and other costs. Other costs represents to all production taxes/subsidies and payroll taxes. All of these inputs are combined via a fixed-proportion relationship of a Leontief function to produce outputs following the principle in the developing of Input-Output Table. By using this function, if there is a plenty of intermediate inputs available for an industry, it does not mean that the level of outputs produced will always increase. It depends on the availability of the primary factor, the working hours of the labour on operating the machines, to keep all inputs in the production are in the fixed-proportion relationship.

FIGURE 2: Structure of production



Source: Adopted from Horridge (2003)

In the lower level of the production structure, there are two nests: import/domestic composition of intermediate inputs and primary factor proportions. Firstly, the intermediate input demands for each producer follows the cost minimisation function through an imperfect substitution of domestic and imported goods using Armington assumption (Armington, 1969). To minimise the costs, the producers choose to purchase the materials from domestic or import whichever give the cheaper price. If the price of material from domestic market increases and become more expensive, the producers would substitute the demand from domestic market to the imported market. The substitution is directed by the CES (Armington) parameter to generate realistic responses of trade to price changes. Secondly, the cost of the demand for primary factors is minimised using the CES function. Similar to the procedure in the intermediate demands, the producers would substitute the more expensive input (capital or labour composite) with the one is cheaper. In the lowest level, the cost of the labour composite demand is minimised using a similar CES function to combine the 16 labour types of inputs. The lowest cost labour types will substitute the more expensive of labour types in order to minimise the total cost of labour usage.

Investment demand

The structure of the final demand for investment by industries is very similar to those in the structure of production except there is no requirement for primary factors and other costs. Capital is assumed to be produced with inputs from domestic and imported commodities. The investment demand is derived from a two-part cost-minimisation problem. At the bottom level, the total cost of domestic and imported commodities is minimised subject to the CES production function. While at the top level, the total cost of commodity composites is minimised subject to the Leontief production function. The total amount of investment in each industry is exogenous to the above cost-minimisation problem. It is determined by other equations.

Household demands

There are 200 representative household categories in the economy, each household maximises its utility by choosing the commodities to be consumed subject to the budget constraint. The nesting structure for household demand is nearly identical to that for investment demand. The only difference is that commodity composites are aggregated by a Klein-Rubin utility function, rather than a Leontief function leading to a linear expenditure system (LES).

The equations for the lower import/domestic nest are similar to the corresponding equations for intermediate and investment demands. The allocation of household expenditure between commodity composites is derived from the Klein-Rubin utility function (Horridge, 2003) where there are two kinds of demand: ‘subsistence demand’ for the requirement of each good that are not considering price and ‘luxury demand’ for the share of the remaining household expenditure allocated to each commodity.

The household utility function only determines the composition of commodities demanded by the households to maximise their utility. The total of household consumption in an economy is generated by the total household disposable income or household income minus the level of income tax (PIT rate) subjected to the income. More detail of the household income equations will be discussed in the section of institutions in the economy.

Export demands

There are two groups of demands: individual and collective exports. For an individual export commodity, foreign demand is inversely related to that commodity's price. For the remaining, collective export commodities, foreign demand is inversely related to the average price of all collective export commodities.

Institutions

There are four institutions in the model: households, corporate, government, and rest of the world. Households as a source of factors of production will have income from the ownership of factors of production. Household income can also be derived from transfers received from governments, corporations, overseas and from other households. Households' income after tax deduction is equal to disposable income, and taxes are a percentage of household income based on the marginal income tax rate structure. Part of disposable income will be spent and the rest will be saved.

Corporate income consists of the revenue from its ownership of production factors minus corporate income tax, and transfer from other institutions. While corporate spending goes to payment or transfer to other institutions. The balance can be defined as corporate saving.

Total government revenue can be described as the sum of receipts from various sources as the following: (i) indirect taxes; (ii) revenue from export tax on each commodity; (iii) revenue from import tariff on each commodity; (iv) personal income tax (PIT) revenue; (v) corporate income tax (CIT) revenue; (vi) transfers from foreign parties; and (vii) revenue from government-owned production factors. Government expenditure consists of expenditure on goods and services for each commodity, and expenditure for the transfer to domestic and foreign parties. Other expenditures made by the government are in the form of subsidies on commodity goods and for industries. Finally, the government revenue minus the government expenditure is defined as the government budget balance (surplus).

In the Rest of the World (ROW), foreign income is defined as revenue of the rest of the world from ownership of production factors, payment received from imported commodities and transfer from other institutions. Foreign expenditure consists of spending for exported commodities, payment to production factors and transfer to other institutions. The balance is defined as foreign saving.

Closure

The CGE model is in comparative static framework, the reaction of the economy to an exogenous shock is at only one point in time. The model has several closures. Firstly, we assume that there is not enough time for the capital stock to adjust and that there is no new investment. Capital is sector-specific, that is, it is fixed for each industry and cannot move between sectors. The capital rate of return adjusts to reflect the changes in the demand of capital. Then the time frame is not long enough for contractual labour to adjust. Hence the real wage rate is fixed. This means that aggregate employment can change to respond to changes in the labour market. In addition, there are some variables that are assigned as exogenous such as tax rates, imports, transfers between institutions and all technological changes. In the policy applications, we run the simulations under non-budget neutrality condition for short-run scenario, the reduction in tax revenue as a result of tax cut policy does not affect the level of government spending or we can say that the government is running the deficit policy to stimulate the economy.

3. SIMULATION SCENARIOS AND MAGNITUDES OF THE SHOCKS

In order to set up the simulation scenarios and the magnitude of the shocks, several steps need to be taken to identify the consequences of the adjustment of the tax-free income threshold to the tax payment of the representative households in the model. Table 5 illustrates the implementation of new tax-free income threshold and the effect of tax payment for five household with different income.

TABLE 4: Illustration of the impact for Individual tax payment (in thousand Rp)

No.	HH's Income	2012				2013				Tax cut
		Tax-free threshold	Taxable Income	Tax rate * Inc. bracket	Tax	Tax-free threshold	Taxable Income	Tax rate * Inc. Bracket	Tax	
1	25,000	19,800	5,200	5%*5,200	260	30,750	-		-	260
2	50,000	19,800	30,200	5%*30,200	1,510	30,750	19,250	5%*19,250	963	548
3	75,000	19,800	55,200	5%*50,000	2,500	30,750	44,250	5%*44,250	2,213	1,068
				15%*5,200	780					
4	100,000	19,800	80,200	5%*50,000	2,500	30,750	69,250	5%*50,000	2,500	1,643
				15%*30,200	4,530			15%*19,250	2,888	
5	275,000	19,800	255,200	5%*50,000	2,500	30,750	244,250	5%*50,000	2,500	
				15%*200,000	30,000			15%*194,250	29,138	2,163
				25%*5,200	1,300					

Memorandum of the progressive tax rate on Personal Income Tax:

Taxable Income	*Rate*	*Taxable Income*	*Rate*
On the first Rp50,000,000.00	5%	On the next Rp250,000,000.00	25%
On the next Rp200,000,000.00	15%	On the next amount of over Rp500,000,000.00	30%

Note: We assume that each household consists of individual taxpayer and three dependents.

Since the policy of raising tax-free income threshold affects across all household categories

and the progressive tax rate applies to the personal income tax so its impact will vary between household categories, ceteris paribus. For example, household no. 2 experiences reducing the taxable income from Rp30.2 million to Rp19.25 million. The level of income is in the bracket of 5% tax rate; resulting Rp0.548 million tax cut. While household no. 5, in the old tax-free income threshold, has a taxable income of Rp255.2 million; subjects to three brackets of tax rate: 5%, 15%, and 25%. In the new tax-free income threshold, the taxable income reduces to Rp244.25 million and only subject to two brackets of tax rate: 5% and 15%. It means there is a portion of taxable income shift from 25% to 15% income brackets; resulting a tax cut of Rp2.163 million.

In order to comparing the impacts with competing alternative policies, we also simulate three different policies as shown at Table 5. In the policy simulations (SIM1, SIM2, and SIM3), we estimate the level of tax cut in each percentile of household (rural and urban) as a result of raising the tax-free income threshold policy. In addition, we also consider estimating the coverage ratio[3] of the personal income tax to have more reliable magnitude of the shocks. Even though in the last decade the number of income tax payers has improved significantly but still concentrated into a small portion of population as indicated by some studies such as Marks (2003), Ikhsan et al. (2005) and Arnold (2012).

TABLE 5: Simulation scenarios

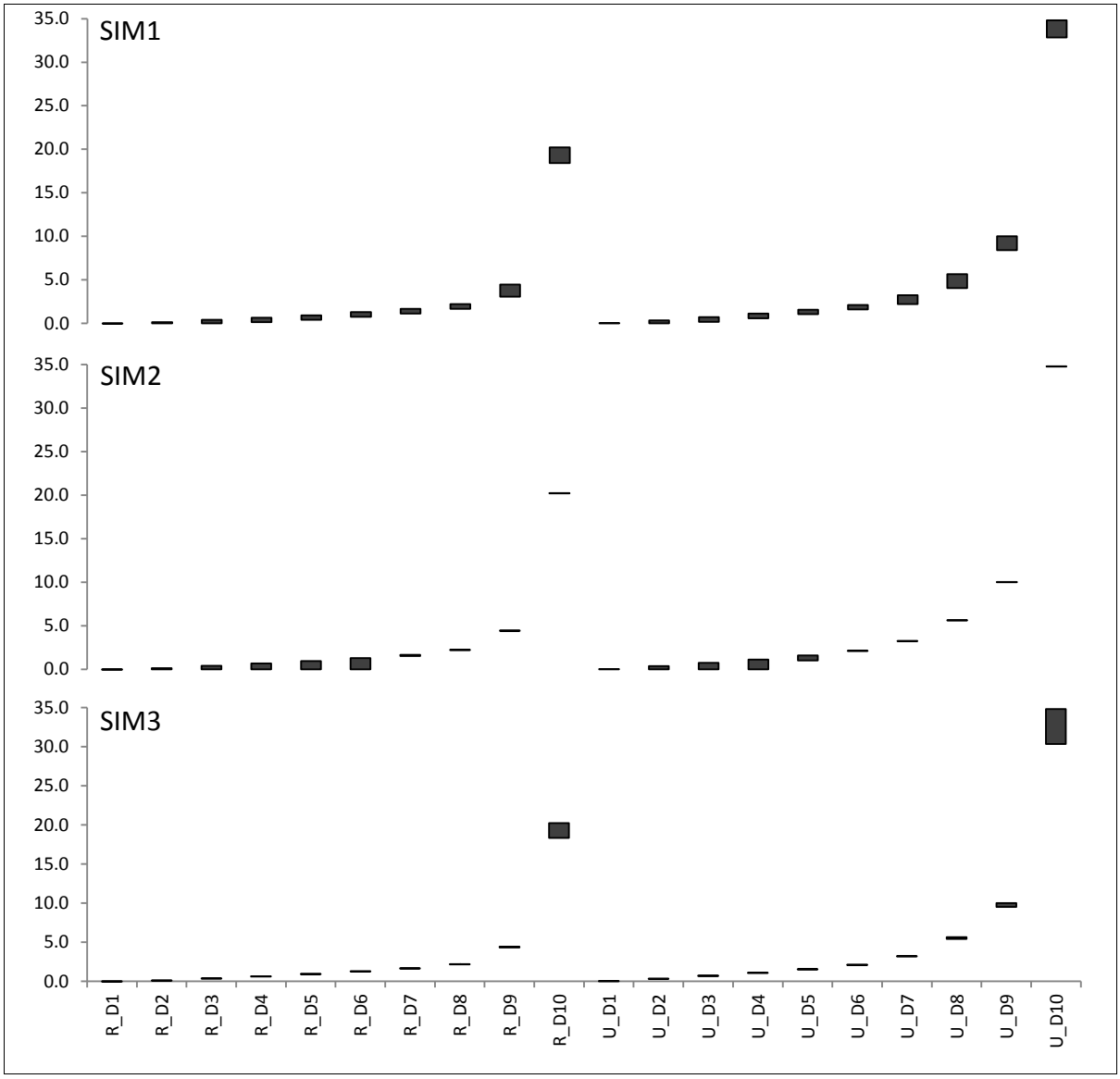
Simulation	Description
SIM1	Increase tax-free income threshold as stipulated at Regulation No. 162/PMK.011/2012
SIM2	Tax-free income threshold eliminated but compensated with low level income tax offset for the household with the level of income up to Rp50 million a year
SIM3	No adjustment on tax-free income threshold but reduces the marginal tax rate: from 30% to 25%, from 25% to 18%; and from 15% to 14%.
SIM4	No adjustment on tax-free income threshold but government make a cash transfer of Rp1 million to the poor household each for the year

To illustrate the magnitude of shocks for SIM1, SIM2, and SIM3 across household income level, Figure 3 shows the average tax cut for each household in the deciles category. As we can see from the table, the first policy (SIM1) does not affect the first deciles of rural household, since the income is still below the old tax-free income threshold. The 9th and 10th deciles in rural area and the 8th, 9th, and 10th deciles in urban area have higher tax-cut than others. The second policy (SIM2) represents the closest policy but with the different approach. By design, SIM2 is better than SIM1 in term of attracting the lower income household groups to include in the tax system with the incentive of tax offset (tax refund). Moreover, SIM2 and also creates better income redistribution as shown at Figure 3 that the tax cut policy benefits most at lower income groups (deciles 3, 4, 5 and 6

[3] Coverage ratio in here is defined as the actual income tax revenue collected by the government compare to its potential in the economy.

at rural area and deciles 3, 4, and 5 at urban area). On the other hand, the third policy (SIM3) represents the tax cut policy that benefits most at the highest income groups (deciles 10 at rural area and deciles 9, and 10 at urban area). At last, the fourth policy (SIM4) is not a tax cut policy rather a cash transfer directly from the government to the poor household Rp1 million each during the year.

FIGURE 3: Average tax cut for each household by deciles (in million Rp)



4. SIMULATION RESULTS AND ANALYSIS

Table 6 present the fiscal impacts of all policy simulations. The result suggests that the tax cut policies in the form of raising tax-free income threshold (SIM1), low level income tax offset (SIM2), and reduce the high marginal tax rates (SIM3) reduce the government revenue from personal income tax by Rp13.92 trillions, Rp6.5 trillions, and Rp5.8 trillions respectively. The

decrease in personal income tax revenue is partially offset by an increase in the revenue from other taxes: corporate income tax, indirect tax, and import tariff. It indicates that the raising tax-free income threshold policy works well to stimulate the economy; indirect tax and import tariff sign for household consumption and corporate income tax as a light of business profitability. The policy of cash transfer to poor household (SIM4) is not tax cut policy but expenditure side policy and the government need to allocate additional spending for it about Rp7.1 trillions. Cash transfer policy also stimulates the economy as indicated by the increase in indirect tax, import tariff, personal income tax, and corporate income tax.

TABLE 6: Fiscal impacts in each different simulation (in billion Rp)

	SIM1		SIM2		SIM3		SIM4	
	Revenue	Expend.	Revenue	Expend.	Revenue	Expend.	Revenue	Expend.
Indirect tax	790	0	301	0	584	0	237	0
Import tariffs	42	0	17	0	26	0	13	0
Personal Income Tax	-13,917	0	-6,520	0	-5,779	0	51	0
Corporate Income Tax	1,175	0	427	0	893	0	326	0
Government consumption	0	2,636	0	965	0	2,030	0	733
Subsidies	0	385	0	147	0	269	0	116
Transfers from/to other inst.	4	538	1	200	3	388	1	7,111
Government saving (deficit)	0	-15,464	0	-7,087	0	-6,962	0	-7,332
TOTAL	-11,906	-11,906	-5,774	-5,774	-4,274	-4,274	629	629

The macro economics impacts of the policy simulations, SIM1 to SIM4, are presented at Table 7 – 10 respectively. The table summarised the impact of the policy to several aspects of economy: (1) the supply side in the form of industrial output and price, (2) the demand side in the form of real consumption by household deciles, (3) macro-economic variables, and (4) the impact to the labour market in term of nominal wages and labour supply (employment).

As already mentioned before, the policy of raising tax-free income threshold (SIM1) works well to stimulate the economy in the short-run scenario. As shown in Table 7, the real GDP increases by 0.038 %. The source of growth is mainly from the increase in the household consumption, accounted for 0.244%. An increase in demand creates the economy in inflationary condition as reflected by an increase of CPI by 0.170%. It brings an impact of losing such level of competitiveness for the export-oriented commodities. The real export decreases by 0.195%.

More detail impacts can be traced in the supply side of the economy. An increase in disposable income as a result of tax cut policy increases the level of domestic consumption. The excess demand in the economy creates a price increase and also an increase in production level. We can see from Table 7 that nearly all commodities experience an increase in terms of price and output. Government services, food-beverage-tobacco, livestock, and restaurant-hotel are example

for the sectors that highly driven by domestic consumption.

Furthermore, the increases in the level of production in the industrial sectors bring the changes in the labour market. In the short-run scenario, we assume fixed capital (no new investment) and fixed real wages. The changes in the labour market are transmitted into the changes in the labour supply (employment) in the form of additional labour or working hours. The changes in the nominal wages are merely adjustment of the inflation. From Table 7, we can link the changes of the labour supply to the industrial output changes and the changes in the nominal wages to the changes in the price of commodities. The variability of the changes is affected by some factors such as the different preference of household consumption and the proportion of the factor of production used in the production activities. As we can see that the significant changes in the labour supply of management-professional (employee and self-employed) in the rural area are related to the significant increase in the output of government services and the high proportion of these type of labour in this sector in rural area (see again Table 2). In sum, the aggregate employment increases by 0.057%.

TABLE 7: Results for SIM1 (% changes)

Supply side		
	Supply	Price
Food crops	0.108	0.170
Other crops	-0.002	0.115
Livestock	0.253	0.282
Forestry	0.024	0.185
Fishery	0.183	0.477
Coal-ore oil mining	-0.018	-0.019
Other mining	-0.001	0.149
Food-beverage-tobacco	0.274	0.146
Textile	0.164	0.041
Woods	0.186	0.090
Papers	0.152	0.064
Chemicals	0.080	0.014
Electricity-gas-water	0.055	0.966
Constructions	0.005	0.122
Trade	0.038	0.187
Restaurant-hotel	0.237	0.190
Road transportation	0.135	0.165
Air-water transportation	0.084	0.135
Transportation supports	-0.037	0.140
Bank-finance	0.072	0.294
Real estate	0.074	0.381
Government services	0.409	0.229
Other services	0.191	0.231

Demand side		
Income by deciles	Rural	Urban
D_01	**0.057**	**0.089**
D_02	0.247	0.460
D_03	0.523	0.549
D_04	0.581	0.451
D_05	0.505	0.377
D_06	0.437	0.315
D_07	0.381	0.480
D_08	0.328	**0.616**
D_09	**0.605**	0.477
D_10	0.427	0.315

Macro-variables			
Real GDP	**0.038**	Real export	-0.195
Real consumption	**0.244**	Real import	0.042
Real investment	0.000	Aggregate employment	0.057
Real government	0.032	Average real wages	0.000
CPI	0.170	Average nominal wages	0.170

Labour market	Nominal wages		Labour supply	
	Rural	Urban	Rural	Urban
Agri. Employee	0.294	0.336	1.176	4.475
Agri. Self-employed	0.278	0.316	0.396	3.865
Prod. Employee	0.152	0.141	0.699	0.371
Prod. Self-employed	0.127	0.173	1.169	1.284
Cler. Employee	0.266	0.240	1.675	0.353
Cler. Self-employed	0.125	0.145	1.025	0.679
Mgt. Employee	0.547	0.409	2.205	0.800
Mgt. Self-employed	0.255	0.277	12.505	4.689

The increase in the labour supply in turn brings an increase in the real domestic consumption classified in the household deciles. The level of real household consumption changes are combination of the changes in the labour supply as a result of policy response in the economy and the initial impact of increasing the disposable income as a direct effect of tax cut policy. As shown in Table 7, the impacts to the real consumption by deciles are varied. The 1st deciles household have very small impacts for both in rural and urban areas. It is due to the 1st deciles are most likely have no direct impacts from the raising tax-free income threshold policy.

Table 8 summarised the impacts of eliminating tax-free income threshold and replaced by the low level income tax offset (SIM2). This policy is expected to have better impact on distributional income. But the magnitudes of the tax cut are smaller or even less than half of SIM1, as shown at Table 6. Therefore, we can see that the impact to the macro economy is relatively small, increase in real household consumption only 0.09% and in economic growth only 0.013%.

TABLE 8: Results for SIM2 (% changes)

Supply side		
	Supply	Price
Food crops	0.061	0.065
Other crops	0.010	0.044
Livestock	0.090	0.105
Forestry	0.024	0.100
Fishery	0.065	0.170
Coal-ore oil mining	-0.007	-0.007
Other mining	-0.000	0.054
Food-beverage-tobacco	0.133	0.064
Textile	0.074	0.018
Woods	0.060	0.033
Papers	0.043	0.020
Chemicals	0.033	0.006
Electricity-gas-water	0.023	0.406
Constructions	0.002	0.044
Trade	0.011	0.067
Restaurant-hotel	0.009	0.060
Road transportation	0.051	0.058
Air-water transportation	0.026	0.045
Transportation supports	-0.015	0.052
Bank-finance	0.016	0.082
Real estate	0.026	0.136
Government services	0.144	0.083
Other services	0.052	0.074

Demand side		
Income by deciles	Rural	Urban
D_01	0.021	0.054
D_02	0.211	0.425
D_03	0.487	0.695
D_04	0.677	0.877
D_05	0.816	0.394
D_06	0.947	0.008
D_07	0.120	0.007
D_08	0.021	0.007
D_09	0.021	0.008
D_10	0.021	0.009

Macro-variables			
Real GDP	0.013	Real export	-0.073
Real consumption	0.090	Real import	0.015
Real investment	0.000	Aggregate Employment	0.020
Real government	0.012	Average real wages	0.000
CPI	0.063	Average nominal wages	0.063

Labour market	Nominal wages		Labour supply	
	Rural	Urban	Rural	Urban
Agri. Employee	0.120	0.132	0.403	1.516
Agri. Self-employed	0.119	0.131	0.136	1.312
Prod. Employee	0.057	0.052	0.239	0.127
Prod. Self-employed	0.048	0.064	0.400	0.439
Cler. Employee	0.087	0.077	0.573	0.121
Cler. Self-employed	0.035	0.040	0.351	0.233
Mgt. Employee	0.195	0.145	0.753	0.274
Mgt. Self-employed	0.093	0.096	4.132	1.587

As expected, the policy has good impact on the distribution of income. From the demand side impacts, we can see that the household income increases and the lower income household i.e.

deciles 2-7 (rural) and deciles 2-5 (urban) experienced relatively high increase in the income. While other deciles group only benefited from indirect impacts that relatively small. It is noteworthy that this policy also only has indirect impact to the poorest household groups, deciles 1 and part of deciles 2 at rural area and part of deciles 1 at urban area. It is because these household categories are not income tax payers due to the income still below the threshold.

The changes in the demand side bring the changes in the supply side of economy. The output of food, beverages and tobacco increase significantly. It follows by other agricultural commodities that highly related with low-middle income type consumption in Indonesia. It is also confirmed by the impact in the labour market which the higher impacts are on those related industries.

On the other hand, Table 9 represent the impact of the policy that benefit only the high level income household by reducing the high marginal tax rates (SIM3). Even though the cost of the tax cut for this policy is smaller than SIM2, but the impact to the economy is higher; as indicated by real household consumption and real GDP that could grow by 0.189% and 0.037% respectively. The factors that may affect this impact need to address further.

TABLE 9: Results for SIM3 (% changes)

Supply side

	Supply	Price
Food crops	0.036	0.121
Other crops	-0.024	0.082
Livestock	0.195	0.205
Forestry	-0.006	0.087
Fishery	0.091	0.262
Coal-ore oil mining	-0.013	-0.015
Other mining	-0.000	0.112
Food-beverage-tobacco	0.122	0.079
Textile	0.078	0.022
Woods	0.156	0.069
Papers	0.147	0.056
Chemicals	0.053	0.008
Electricity-gas-water	0.032	0.570
Constructions	0.004	0.093
Trade	0.046	0.145
Restaurant-hotel	0.610	0.197
Road transportation	0.098	0.130
Air-water transportation	0.066	0.104
Transportation supports	-0.025	0.104
Bank-finance	0.075	0.272
Real estate	0.063	0.314
Government services	0.327	0.175
Other services	0.214	0.214

Demand side

Income by deciles	Rural	Urban
D_01	0.052	0.067
D_02	0.052	0.065
D_03	0.052	0.063
D_04	0.051	0.060
D_05	0.050	0.058
D_06	0.049	0.055
D_07	0.049	0.079
D_08	0.048	0.133
D_09	0.088	0.191
D_10	0.215	0.494

Macro-variables

Real GDP	0.037	Real export	-0.144
Real consumption	0.189	Real import	0.032
Real investment	0.000	Aggregate Employment	0.059
Real government	0.025	Average real wages	0.000
CPI	0.124	Average nominal wages	0.124

Labour market	Nominal wages		Labour supply	
	Rural	Urban	Rural	Urban
Agri. Employee	0.184	0.206	1.214	4.625
Agri. Self-employed	0.166	0.190	0.409	3.994
Prod. Employee	0.110	0.108	0.721	0.383
Prod. Self-employed	0.094	0.133	1.206	1.325
Cler. Employee	0.253	0.232	1.729	0.364
Cler. Self-employed	0.155	0.185	1.058	0.701
Mgt. Employee	0.428	0.327	2.278	0.826
Mgt. Self-employed	0.197	0.230	12.935	4.844

In term of distributional income effect, the policy (SIM3) affects significant income increase of the household at deciles 9-10 (rural) and deciles 7-10 (urban) with the highest impacts in the top deciles and decreasing to the lowers. Other deciles experiences only indirect impact of the policy. But we can see that the indirect impact of SIM3 is higher than SIM2 even though with the lower value of tax cut. It indicates that tax cut policy at high level income household group has higher impact than at low level income household group.

The impact of policy SIM3 at supply side is related to middle-high income household. As shown at Table 9 that restaurant and hotel experienced the highest increase in output; not food, beverages, and tobacco. Restaurant and hotel is classified as consumption type that highly related with middle-high income household.

In contrast with three previous policies, SIM4 is not tax cut policy but direct cash transfer from the government to the poor household. It has similar effect to stimulate the economy, the real household consumption increases by 0.069% to make the overall economy to grow at 0.010%. Even though the value of the cash transfer is a bit higher than the value of tax cut at SIM2 and SIM3 but the level of impact on the economy is smaller.

TABLE 10: Results for SIM4 (% changes)

Supply side		
	Supply	Price
Food crops	0.076	0.053
Other crops	0.018	0.036
Livestock	0.050	0.074
Forestry	0.031	0.103
Fishery	0.037	0.106
Coal-ore oil mining	-0.005	-0.005
Other mining	-0.001	0.042
Food-beverage-tobacco	0.123	0.056
Textile	0.053	0.014
Woods	0.023	0.020
Papers	0.025	0.014
Chemicals	0.025	0.005
Electricity-gas-water	0.023	0.396
Constructions	0.001	0.034
Trade	0.008	0.053
Restaurant-hotel	0.006	0.046
Road transportation	0.035	0.043
Air-water transportation	0.011	0.027
Transportation supports	-0.015	0.041
Bank-finance	0.003	0.040
Real estate	0.024	0.118
Government services	0.099	0.062
Other services	0.026	0.050

Demand side		
Income by deciles	Rural	Urban
D_01	5.553	4.446
D_02	1.983	0.002
D_03	0.018	0.002
D_04	0.018	0.002
D_05	0.018	0.003
D_06	0.019	0.003
D_07	0.019	0.003
D_08	0.019	0.003
D_09	0.020	0.004
D_10	0.020	0.005

Macro-variables			
Real GDP	0.010	Real export	-0.056
Real consumption	0.069	Real import	0.011
Real investment	0.000	Aggregate Employment	0.015
Real government	0.009	Average real wages	0.000
CPI	0.049	Average nominal wages	0.049

Labour market	Nominal wages		Labour supply	
	Rural	Urban	Rural	Urban
Agri. Employee	0.099	0.102	0.315	1.187
Agri. Self-employed	0.110	0.115	0.107	1.027
Prod. Employee	0.044	0.039	0.188	0.100
Prod. Self-employed	0.035	0.047	0.313	0.344
Cler. Employee	0.061	0.054	0.449	0.095
Cler. Self-employed	0.026	0.029	0.275	0.183
Mgt. Employee	0.139	0.104	0.590	0.215
Mgt. Self-employed	0.070	0.071	3.225	1.242

The advantage of cash transfer policy is that it target to the poor household directly. As we can see from Table 10, the real income of poor households (deciles 1-2 at rural and deciles 1 at urban) increases significantly while others only have relatively small (indirect) impacts. In addition, the impacts of the cash transfer policy to the supply side of economy and labour market are relatively similar to the impacts of SIM2 (tax cut at low level income households).

5. CONCLUDING REMARKS AND FURTHER RESEARCH

In this paper, the integrated multi-household CGE model is used to simulate the distributional welfare impact of the raising tax-free income threshold in Indonesia that started to implement on 1st January 2013. The model database is consolidated from Indonesia IO, SAM, and Susenas for the year of 2008. The model has 200 household categories to represent the percentile household income distribution in two different areas: rural and urban. Four scenarios of the policy are evaluated, not only increasing tax-free income threshold but also three competing alternative policies: (1) eliminating the tax-free income threshold and replaced by low income tax offset, (2) reducing the higher marginal tax rates, and (3) giving cash transfer to poor households.

The results suggest that the policy of increasing tax-free income threshold (SIM1) could increase the economic welfare as shown in aggregate by the increase in real GDP growth and real household consumption. It concludes that raising the tax-free income threshold policy work well to stimulate the economic growth.

In terms of distributional welfare impact, we find that the magnitude of impacts are varies across the household categories. The distributional welfare impact is affected by direct and indirect impact of the policy to the household disposable income or consumption. The direct impact in the form of tax cut is a product of the household income levels and the progressive rate in the Indonesia income tax system. On the other hand, the magnitude of indirect impact is defined by the structure of the economy such as the characteristics of household consumption and the proportion of the factor of production in each economic activity. The structure of economy is characterised by the database, set of parameters, and the equation system in the CGE model.

Unfortunately, the lowest household income deciles only have very small increase in the impact of real consumption for both rural and urban areas. Even though the raising tax-free income threshold affects across all tax payers, all household categories but the household with higher income benefited more.

By comparing the result of the policy to three competing alternatives, we can conclude as follows:

(1) Three competing alternative policies also have a good effect to stimulate the economy with varies magnitude of impacts.

(2) The policy of eliminating the tax-free income threshold and replacing with low level income offset (SIM2) has better distributional impact since the policy limits to the low level income

household groups. But still the poor households only have benefit from very small (indirect) impact since they are not tax payers.

(3) The policy of reducing high marginal tax rates or tax cut at high income household groups (SIM3) give higher impact on fostering economic growth but relatively small (indirect) impacts to the lower income household groups.

(4) The policy of cash transfer (SIM4) is the best to target the poor but only give relatively small impact to the growth.

In term of policy implementation, the tax cut policies (SIM1, SIM2, and SIM3) are easy to be applied since the tax system and administration already in place, but cash transfer policy (SIM4) need such additional cost to administer the operational. The policy of using low level income tax offset (SIM2) brings a good opportunity to extend the coverage of tax payers from low-middle income. This policy will attract these household groups to enter the tax system. It will address the current issue of only small portion of population that already registered and actively contribute as tax payers. Then, the policy of tax cut at high income household groups (SIM3) may be fit at crisis situation. If we can combine the cash transfer policy (SIM4) in the tax system, it will reduce the cost administration. Although to do so, it needs hard work to cover low-middle income households to the tax system particularly for the households in rural area. But it is worth in the long-run, not only to improve the tax system and administration but also to make better environment to combine wider alternatives of tax policy that fit best to the objectives such as redistribution of income and fostering economic growth.

There are many possible ways the study could be extended. First, further research could analyse the effect of raising the tax-free income threshold in the regional CGE model framework. Indonesia economy diversifies into many regions with different characteristics, particularly in the distributional household income and the factor production composition. As we all know that assessing the impact in the regional level will give more flavour in the economic development policies rather than in the national level.

Second, the simulations are only focusing on the raising tax-free income threshold policy. Usually in the policy implementation, the adjustment of the tax-free income threshold will complemented by the increase in the minimum labour wages that effective by regions in Indonesia. In addition of the methodological approach in the regional modelling framework, it is also necessary to evaluate the combination policy of the adjustment of the tax-free income threshold and provincial/district minimum labour wages.

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